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**Sustainable Cities for a Sustainable Future: Integrating
Sustainable Development Goals into Urban Planning**

Maria Cristina STERIE¹, Ileana Lucica BOTA^{2*},
Eduard Alexandru DUMITRU³, Steliana RODINO⁴

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Abstract

This paper presents a detailed bibliometric analysis of the existing literature on the integration of sustainable development objectives in cities. The purpose of this analysis was to identify the trends and evolution of research in this field, as well as to record a significant contribution of researchers and institutions in promoting sustainable development in the urban environment. Also, the situation of Romania regarding the implementation of sustainable urbanism will be seen. Relevant articles published in peer-reviewed journals and academic databases were identified and evaluated. Topics covered in these papers include: policies and strategies for sustainable urban development, technological tools for measuring sustainable city performance, good practices in urban planning and development, and the impact of urban development on the environment and the quality of life of citizens.

Keywords: sustainable development goals, urban planning, bibliometric analysis, Romania.

JEL Classification: Q01, O10, O20.

¹ Bucharest University of Economic Studies, The Research Institute for Agriculture Economy and Rural Development, Bucharest, Romania, steriemaria94@gmail.com.

² "Valahia" University from Targoviste, Targoviste, Romania, luci_bota@yahoo.com.

* Corresponding author.

³ The Research Institute for Agriculture Economy and Rural Development, Bucharest, Romania, dumitru.eduard@iceadr.ro.

⁴ The Research Institute for Agriculture Economy and Rural Development, National Institute of Research and Development for Biological Sciences, Bucharest, Romania, steliana.rodino@yahoo.com.

1. Introduction

In recent decades, the concept of sustainable development has become a central theme in the global debate on how to build a better and fairer world for all the inhabitants of our planet. Sustainable development is a holistic approach to economic, social and environmental development that takes into account the impact of our actions on the environment and on future generations.

In the urban context, sustainable development becomes a critical issue, as cities are the centres of economic and political power, but also the main sources of greenhouse gas emissions, resource consumption, and pollution (Nagy et al., 2018; Popa, 2015).

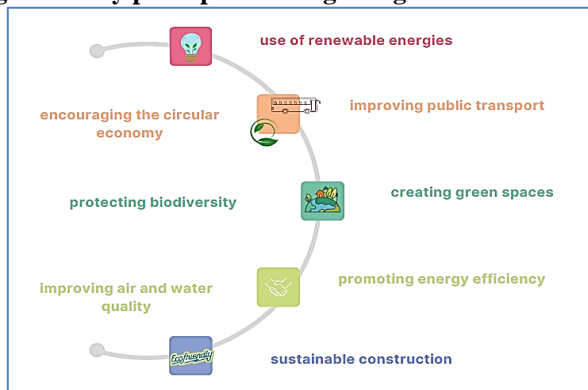
Cities are the main driver of economic development and are responsible for a significant proportion of global resource consumption and greenhouse gas emissions. In addition, rapid urban population growth means that cities are often overcrowded and highly polluted, which can lead to a variety of health and social problems (Sterie et al., 2022).

The Sustainable Development Goals (SDGs) are a set of 17 global goals adopted by the United Nations in 2015 as part of the 2030 Agenda for Sustainable Development. These goals were developed following a broad consultative process and are designed to promote a more sustainable and equitable future for all people on the planet (Ivan et al., 2020). The Sustainable Development Goals cover a wide range of issues, from reducing poverty and inequality to combating climate change and protecting biodiversity (Assembly, 2015; Pătărlăgeanu et al., 2020).

In the current context of climate change and global economic development, the concept of sustainable development is becoming increasingly important for cities and their communities (Dumitru et al., 2022).

Integrating sustainable development goals into cities involves using sustainable development principles to plan, design, and manage urban development to ensure that it is sustainable and equitable. This approach aims to ensure urban development that is less polluting, more resilient to climate change, more inclusive, and more accessible to all citizens (Weymouth et al., 2018; Moallemi et al., 2020).

Figure 1. Key principles of integrating the SDGs into cities



Source: Adaptation after Weymouth et al., 2018.

The implementation of these principles can be achieved through urban development plans, regulations and public policy, infrastructure projects, as well as by involving citizens and the local community in the decision-making process.

Their implementation in cities is also a continuous and complex process that requires a holistic approach and collaboration between the different sectors and actors involved. However, the benefits of this approach can be significant, not only for the environment, but also for the quality of life of citizens and the local economy (Klopp et al., 2017; Serbanica et al., 2017).

Integrating sustainable development goals into cities is essential for a more sustainable and equitable future for all residents (Ban et al., 2022). Cities play a crucial role in achieving sustainable development goals, as they are responsible for a large share of greenhouse gas emissions, resource consumption, and waste production. In addition, cities are also the places where the majority of the population lives and works, which means that the sustainable development of cities can have a significant impact on people's quality of life (Sarkis et al., 2022).

Numerous studies and research have explored how sustainable development goals can be integrated into urban planning and urban development. For example, one study looked at how the circular economy principles can be integrated into urban planning to reduce resource consumption and waste production in cities (Sanchez et al., 2018; Constantin et al., 2021).

In Romania, the Sustainable Development Goals require monitoring at the local and regional level, i.e. an integrated approach that can interconnect the synergies of the different goals (Firoiu et al., 2019). In a paper by Benedek et al., 2021, different indicators were identified from different areas such as health, Education, Energy, Economy in order to make an assessment of the SDGs in different regions of Romania. Therefore, weaknesses and strengths of the goals were identified so that they can be used in policies and actions to achieve a good integration of the SDGs (Benedek et al., 2021).

In the paper "Integrated urban regeneration: solution for revitalising cities" the authors extol the concept of urban regeneration and offer solutions for cities to address certain challenges both economic and environmental. Clear examples, namely urban regeneration projects in Romania, are given to assess their impact. The findings show that urban regeneration can be a solution to urban revitalisation, creating a sustainable urban environment and improving the quality of life (Alpopi, Manole, 2013).

In terms of best practices, as early as 2014, the city of Vienna developed a sustainable urban development plan in 2014, known as "Smart City Wien". This plan focuses on four main areas: energy, mobility, buildings, and technology. The plan aims to reduce greenhouse gas emissions, improve air quality, and use natural resources efficiently (Hesamin et al., 2017; Kramer et al., 2016).

The city of Copenhagen has committed to becoming a zero-emission city by 2025. To achieve this goal, the city is focusing on promoting electric transport, the use of renewable energy and improving the energy efficiency of buildings (Wejs et al., 2018; Olhoff et al., 2014).

The city of Barcelona also adopted a strategic plan for sustainable urban development in 2000, which aims to integrate sustainable development goals into all public policies. This strategy has led to significant improvements in energy efficiency, public transport, waste and water management (Marí-Dell'Olmo et al., 2016).

In a work carried out in 2018 on the topic of the sustainable development of Romanian cities, emphasis was placed on a perspective in which Romanian cities can be managed in a social, ecological, and economic way. Several case studies were taken into account, highlighting the local decision-making factors that can contribute to the development of innovative solutions to current urban problems. The results show that through a good management of resources and renewable energy, Romania can develop sustainable and resilient cities (Tulbure, 2016).

2. Problem Statement

In Romania, sustainable urban planning, sustainable transport transformation and increased energy efficiency should be the main objectives and guidelines so that sustainable development goals are integrated into cities. Cities should also promote recycling and proper waste management by offering separate collection programmes, providing adequate infrastructure, and educating the public on the importance of proper waste management. Involving citizens by getting their feedback and suggestions is also an important point in the integration process, through which their priorities and needs for sustainable development can be identified.

In the framework of the works, the country of Romania was chosen for analysis due to the reasons necessary for urban planning for several reasons, namely, this planning helps to protect the environment and conserve resources, but also to reduce natural risks, namely, climate which includes pollution, floods, and drought.

3. Research Questions and Objectives

Taking into account the above context, this paper seeks to answer the following question: What is the current state of research on the integration of sustainable development objectives in cities and what are the emerging trends and research gaps in this field?

The objectives of the paper are to carry out a systematic bibliometric analysis of the existing literature on sustainable development in urban areas, using tools such as citation analysis, co-citation analysis, and keyword analysis and identifying the most influential publications in the field.

The hypothesis of the paper is represented by the volume of research on the integration of sustainable development objectives in cities that has increased over time, and there are emerging trends and research gaps that can guide future research in this field. The hypothesis suggests that there has been an increase in the volume of research on sustainable development in urban areas over time, which can be examined through bibliometric analysis.

4. Research Methods

Bibliometric analysis is a quantitative analysis of specialised literature through which data mapping is carried out (Donthu et al., 2021).

To define the search, the group of words "integration of sustainable development objectives in cities" was selected *topic* and the *plain text* database was exported from the Web of Science where 194 papers were identified (Moral-Muñoz et al., 2020; Sterie et al., 2023). The database was entered into the VosViewer software, where maps were generated through which we could identify the words interconnected with the subject studied, the countries that address this subject the most, the connection between them, as well as the research directions addressed. In the study, the scientific articles most appreciated by the academic environment were analysed, also taking into account the novelty of the articles.

5. Findings

On the subject of "integration of sustainable development objectives in cities", 271 scientific articles were produced in the period 2004-2022. the main topics in which they were included are green sustainable science technology (69 papers), environmental sciences (61 papers), environmental studies (52 papers), energy fuels (43 papers), urban studies (38 papers), construction buildings technology (22 papers), electronic electrical engineering (18 papers), regional urban panning (27 papers), civil engineering (16 papers), engineering environment (15 papers) (Figure 2).

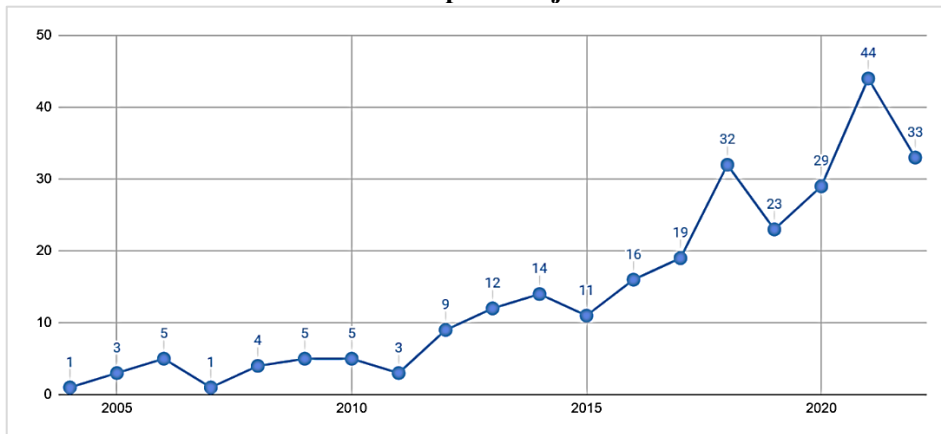
Regarding the evolution of specialised works on the studied subject, according to the Web of Science database, the first work was carried out in 2004, reaching the maximum number of works in 2022, namely 44 works, which will decrease in the following year to 33 works. In the year 2022, the studied topic presented a major interest for researchers, representing an interdisciplinary topic that is of great interest to researchers, academics, and practitioners who try to better understand these global problems and find practical solutions to address them (Figure 3).

Figure 2. Treemap regarding the areas of interest of the works carried out on the subject of "integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results.

Figure 3. The evolution of the works carried out on the subject of "integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results.

Next, the content of the first 5 most cited papers found in the Web of Science database was studied.

In the work entitled "Ecosystem services in urban plans: What is there, and what is still needed for better decisions", the authors claim that ecosystem services are key elements for sustainable urban development through the analysis of 22 urban plans from 22 Italian cities. Starting from the hypothesis that urbanisation plans should be based on an internalisation mechanism, the results show that there are a number of instruments that achieve this aspect, and in order to be able to evaluate ecosystem services, it is necessary to reflect on the urban green infrastructure (Cortinovis et al., 2018).

The second most cited paper is entitled "Smart Energy Systems for Sustainable Smart Cities: Current Developments, Trends and Future Directions" presents the evolution of the current smart energy sector, highlighting the key challenges of this sector, but also the guidelines for the future. By integrating ML and CI, future challenges can be addressed and contribute to enriching the theoretical baggage and guiding research communities regarding case studies and challenges encountered (O'Dwyer et al., 2019).

The transition to resilience of cities requires the presentation of some useful descriptors, namely the barriers of planning objectives. In the work "Transitioning to resilience and sustainability in urban communities", the authors raised certain questions regarding the integration of green infrastructure in cities, the operationalisation of urban planning for climate change resistance, policies to limit urban expansion, which should represent main research topics and indicators for integrating resilient systems in cities. The interdependence of quality of life and land use must be a starting point for urban planning if sustainable goals are to be implemented. Integrating resilience can produce conflicts at the socio-economic and market level, but also in terms of European trade policies (Collier et al., 2013).

Table 1. The most cited works on the subject of "integration of sustainable development objectives in cities"

Document title	Year of publication	Citations number
Ecosystem services in urban plans: What is there, and what is still needed for better decisions	2018	154
Smart energy systems for sustainable smart cities: Current developments, trends and future directions	2019	136
Transitioning to resilience and sustainability in urban communities	2013	132
Planning for sustainable accessibility: The implementation challenge	2008	104
Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies	2013	99

Source: Edited by authors based on WoS results.

The paper entitled "Planning for sustainable accessibility: The implementation challenge" focuses on a planning strategy called "Network City", which involves a series of changes to existing planning. The aim of the strategy is to create a network to support an efficient public transport system. Starting from the development to the restructuring of the urban area, involving a mixed land use and setting clear objectives related to the population, the employment of the entire region is analysed. Challenges were not slow to emerge; I assume sustainable accessibility, changes to existing practices, strong leadership, and proactive approaches (Curtis, 2008).

Climate change, reducing flood risks, respectively thermal stress, and preserving sustainable objectives are the main topics addressed in the work "Mainstreaming climate adaptation into urban planning: overcoming barriers, seizing opportunities and evaluating the results in two Dutch case studies". The authors integrated a conceptual model into two Dutch urban planning case studies with the aim of demonstrating the dynamism of the process and generating discussions on the value criteria of integration in relation to climate adaptation targets. The results showed that the climate adaptation situation is a difficult one, requiring the stability of synergies and deliberate decisions to be able to take into account current and future impacts (Uittenbroek et al., 2013).

Regarding the keywords used at least 5 times in a scientific paper, they were grouped into clusters, and the most representative keywords are represented by city, environment, circular economy, renewable energy, green infrastructure, and infrastructure, city intelligent. These words suggest that our work focuses on the "city" where the problems related to the environment, circular economy, renewable energy, and green infrastructure must be solved. Information and even communication technologies are also needed to be included in urban planning and to improve the quality of life, so as to lead to the emergence of smart cities.

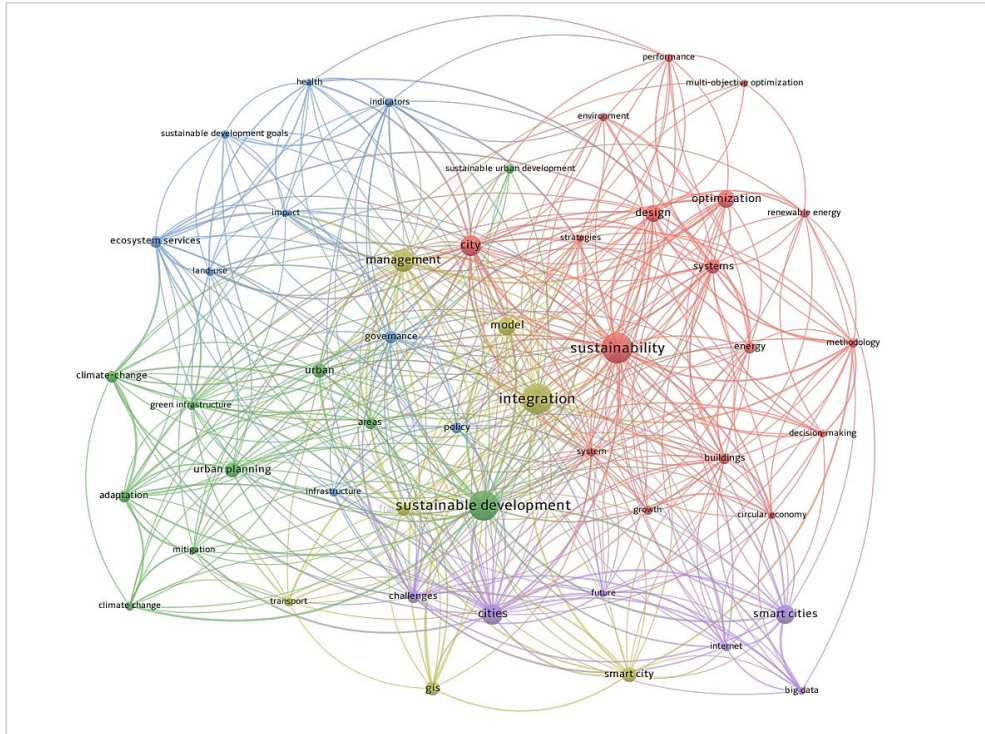
The first red cluster called "sustainability" includes city, strategies, environment, performance, system, multi-objective optimisation, renewable energy, buildings, circular economy, growth, methodology (Figure 4).

The second green cluster, entitled "sustainable development", includes urban planning, zones, urban, mitigation, climate change, adaptation, green infrastructure.

The third blue cluster called "ecosystem services" includes land use, impact, sustainable development goals, health, indicators, governance, policy, infrastructure.

The fourth yellow cluster, called „integration", includes model, management, transport, smart city (Figure 4).

Figure 4. The link between keywords and " integration of sustainable development objectives in cities"



Source: Edited by authors based on WoS results using VOSviewer.

Analysing the keywords according to the years, we notice that in 2016 and 2017, research focused on urban planning, areas, model, environment, system, optimisation, gis, health.

In 2018 and 2019, the focus was on sustainable development, integration, management, city, sustainability, strategies, design, indicators, impact, land use, climate change, management.

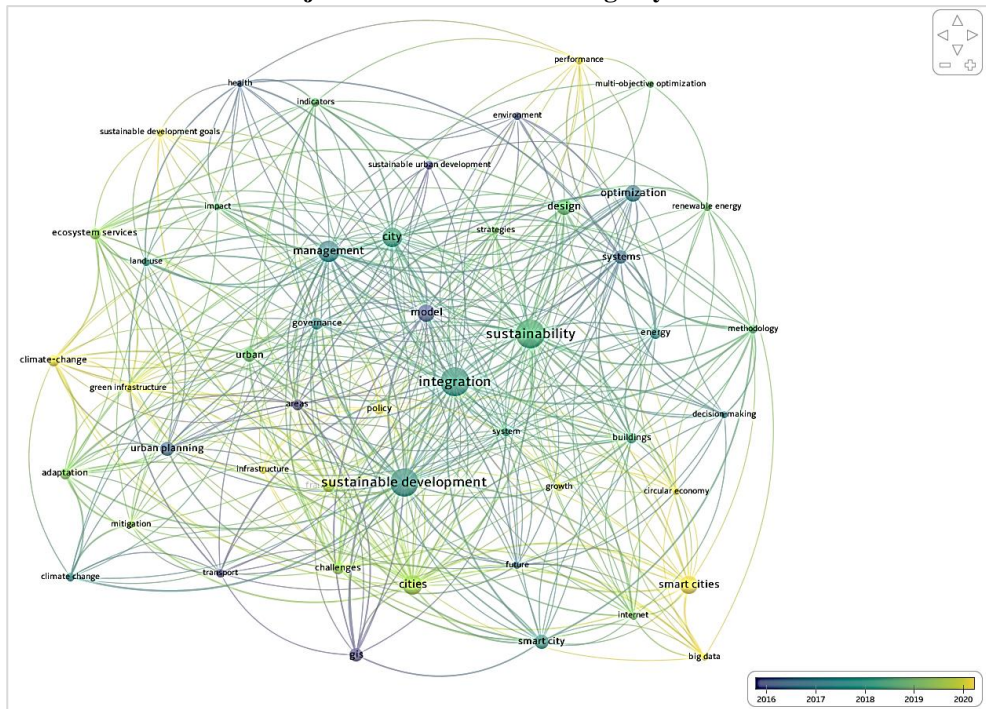
Later, in 2020, the main topics were climate change, green infrastructure, policy, smart-cities, big-data, performance, sustainable development goals.

According to the keywords, there has been an evolution of research themes, for example, since 2016 the focus has been on urbanism, models, and systems, while in the following years the focus has been on sustainable development, climate change.

At the same time, there is a concern among researchers about the integration of sustainable principles, reflected by the terms sustainability, smart cities, and green infrastructure.

By making this map, a multidisciplinary approach to sustainable urban planning is also shown (Figure 5).

Figure 5. The link between keywords and " integration of sustainable development objectives in cities" according to years

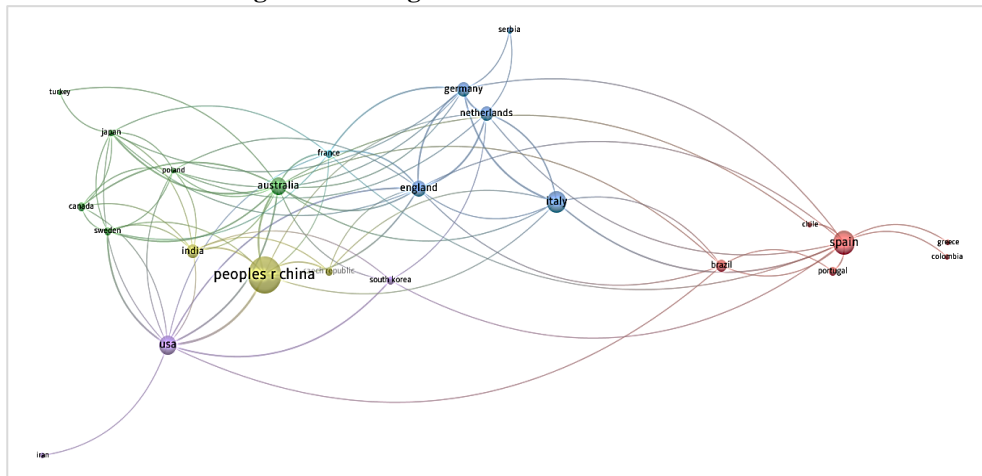


Source: Edited by authors based on WoS results using VOSviewer.

In the figure above, the degree of relationship between countries, the research directions, and the interest addressed to the subject is identified according to the size of the node. We notice that China together with Austria, the United States of America, and Spain pay special interest to the studied subject, presenting different research directions. China presents a large number of works on the subject under study due to the progress made in recent years regarding poverty reduction improving access to education and healthcare, increasing energy efficiency and expanding renewable energies, reducing greenhouse gas emissions and protecting natural resources. Also, closely related European Union countries are identified, such as Germany and the Netherlands, Spain, and Portugal, which present the same research direction. The European Union has addressed a series of measures regarding clean energy, environmental protection, social responsibility, and education and

training in order to achieve the goals of sustainable development and overcome current challenges (Zang et al., 2011; Janik et al., 2020) (Figure 6).

Figure 6. Linkage between co-author countries



Source: Edited by authors based on WoS results using VOSviewer.

6. Conclusions

The increased interest in the Sustainable Development Goals is demonstrated by the large number of articles produced on the subject. Also, important global commitments to sustainable development and to tackling major global problems such as poverty, hunger, inequality, climate change, and biodiversity loss.

Many developing countries have made a strong commitment to achieving the SDGs, as they could contribute to the goal of living standards for their populations and the growth of their economies. At the same time, many developed countries are paying particular attention to SDG research because they are aware of the global impact of environmental and development issues and want to contribute to a more sustainable future.

A sustainable future requires the development of a strategic plan that includes a vision and mission for this planning. Furthermore, partnerships and collaborations between the private and public sector, organisations, and stakeholders can contribute to the implementation of the SDGs. Citizens also play an important role in mainstreaming the goals and developing new solutions for better development.

In Romania, sustainable urban planning, sustainable transport transformation, and increased energy efficiency should be the main objectives and guidelines so that the SDGs are integrated into cities. Cities should also promote recycling and proper waste management by providing separate collection programmes, providing adequate infrastructure, and public education on the importance of proper waste management. Involving citizens by obtaining feedback and suggestions is also an important point in the integration process, through which priorities and needs for sustainable development can be identified (Vranceanu, 2012; Munteanu, 2022).

The novelty factor that the research offers is the multidisciplinary and collective approach and the tackling of contemporary problems. By adopting an approach that values the diversity of disciplines, the research brings together knowledge and expertise from fields as varied as urban planning, architecture, ecology, economics, and sociology. This interdisciplinary collaboration enables a deep and comprehensive analysis of how urban development influences the environment. Integrating these different perspectives contributes to a more complex understanding of the complexity and interdependence of urban processes and their environmental implications.

The limitations of the research are unpublished papers, papers from certain conferences, and various reports not in the Web of Science database. Future research directions are to focus on solutions to adapt to environmental change, promote urban planning practices and research that can explore urban transport.

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